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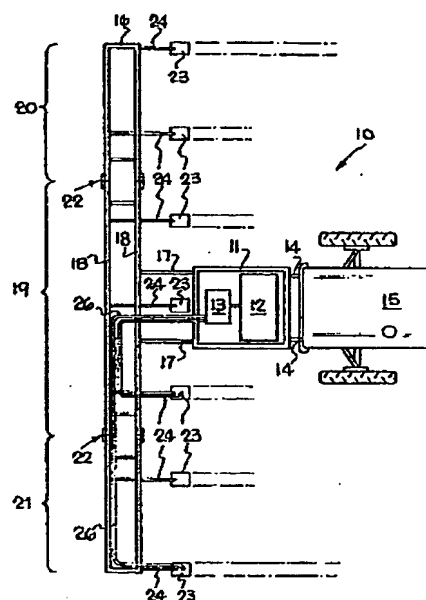
GB 0685060

(58) Field of search

E1G

(54) Line marking apparatus

(57) Line marking apparatus (10) for securement to, for example, the front of a tractor (15) includes a transversely extending boom (16) mounted on a body (11), a plurality of spaced apart marker heads (23) depending from the boom, each marker head being connected in fluid flow communication with the output of a pump unit (13) connected to a source (12) of marking fluid.

**FIG 1**

The drawings originally filed were informal and the print here reproduced is taken from a later filed formal copy.
The claims were filed later than the filing date within the period prescribed by Rule 26(1) of the Patents Rules 1982.

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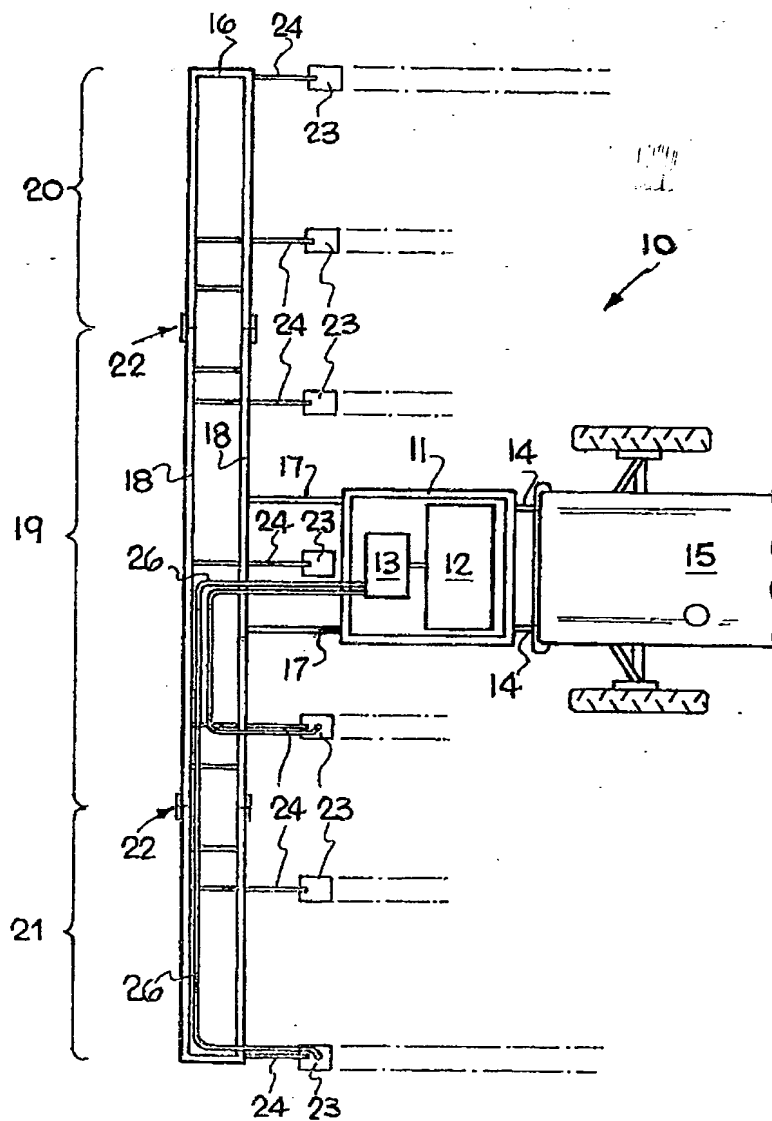
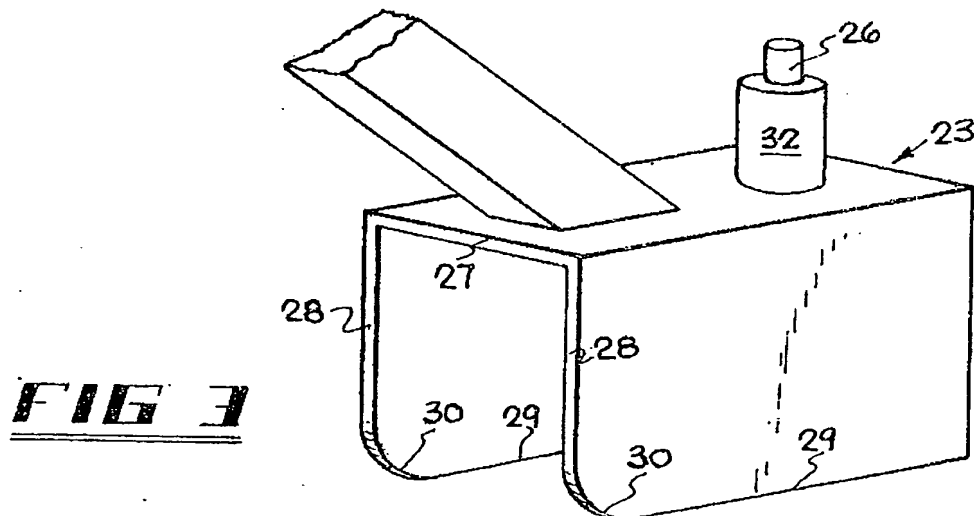
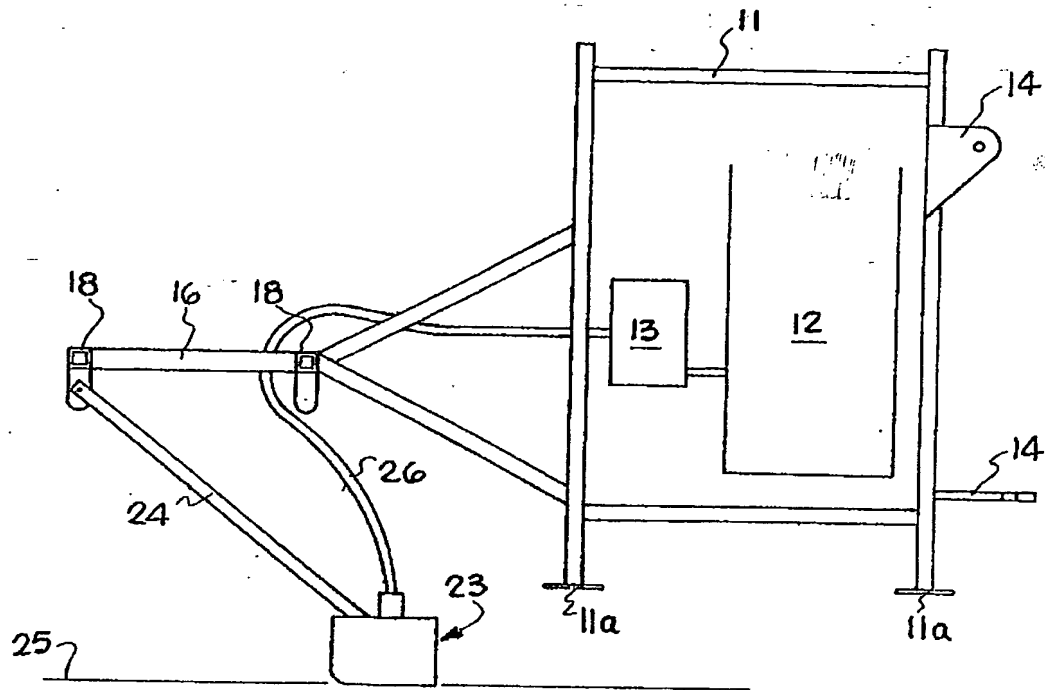


FIG 1

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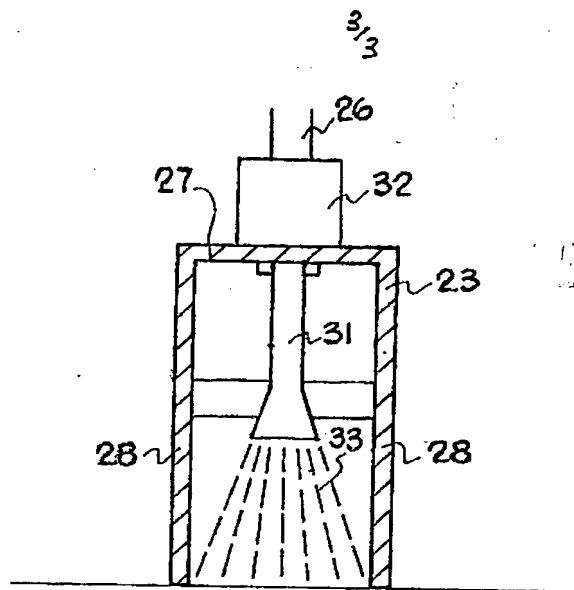


FIG 4

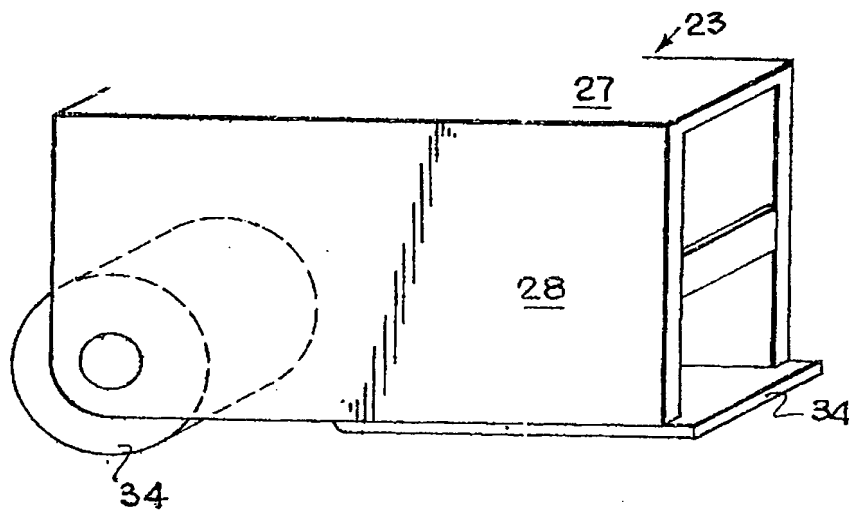


FIG 5

SPECIFICATION

Line marking apparatus

5 This invention relates to line marking apparatus for use in marking a plurality of lines on sports surfaces, particularly but not exclusively on running tracks.

A normal running track is 400 metres long in the form of a loop having two 100m parallel straight sections and two semi-circular bend sections. To mark out, on a grass field or other surface which is not permanently in use as a running track, the necessary six lanes is a time and, therefore, money, consuming task if a manually-propelled apparatus is to be used, even if the manual apparatus can mark two lines simultaneously.

An object of the present invention is to provide an improved line marking apparatus.

20 Accordingly, the invention provides line marking apparatus having: a body; means for securing the body to a vehicle; a boom arranged to extend transversely of the direction of travel of the vehicle; a plurality of marker heads depending from the boom; a plurality of flow conduits connecting the heads to a supply of marking fluid; and a pump connected to said conduits for supplying marking fluid to said marker heads.

The pump can be driven from a power takeoff of the vehicle or by a battery or by its own prime mover. The battery can be that of the vehicle or a separate battery. The boom can be foldable or otherwise jointed to be movable between its deployed condition and a transport condition wherein its width is reduced.

The supply of fluid can be a tank in the body or a separately mounted tank. The body is preferably securable to the front of a tractor. In this case the tank may be separate and at the rear of the tractor.

40 The marker heads may be seven in number. Each marker head may be in the form of a pair of parallel side plates between which a spray nozzle is disposed. Each spray nozzle can be a fan-tail spray nozzle, the fan extending transversely of the side plates. The side plates can constitute ground-engaging runners or can carry a skid and/or a ground-engaging roller or rollers.

Each marker head can be mounted on the lower end of a trailing arm whose upper end is pivotally connected to the boom about an axis. Generally parallel to the boom axis. Each trailing arm can be provided with means for locking it in a raised position.

The invention will be described further, by way of example with reference to the accompanying drawings wherein the various figures are illustrative sketches, not to scale illustrating how the invention may be put into effect. Specifically:-

Figure 1 is a plan view of a preferred apparatus attached to the front of a tractor;

Figure 2 is a cross-sectional side view of the apparatus;

Figure 3 is an enlarged perspective view of a marker head;

Figure 4 is an enlarged cross-section through a

marker head; and

Figure 5 is an enlarged side/perspective view of a modified marker head.

A preferred line marking apparatus 10 is constructed overall from square-section steel tubing and comprises a frame-like body 11 which houses a tank 12 for marking fluid, a pump unit 13, and controls (not shown). The body 11 has means 14, such as brackets, by which it can be releasably secured to the front of a tractor 15. The body 11 has feet 11a (Figure 2) for supporting the apparatus 10 when not in use.

To the front of the body 11 is attached a boom 16 by struts 17. Boom 16 is also frame-like, having major parallel members 18, and is divided into a central and two distal sections 19, 20, 21 respectively, each distal section 20, 21 being connected to the central portion 19 by a knuckle joint arrangement 22 (not shown in detail) which enables the distal portions to be folded to reduce the boom length during transportation on the tractor and in storage.

The boom 16 carries seven marker heads 23, each at the lower rear end of a trailing arm 24 whose front upper end is pivotally attached to the front member 18 about a fixed axis parallel to the major axis of the boom 16. The marker heads rest, in use, on the ground 25 and are drawn over the ground surface. A flexible tube 26 connects each marker head 23 to the pump unit 13. For transportation the trailing arms 24 can be lifted and locked to the rear member 18.

Referring to Figures 2 to 4, each marker head 13 consists of a short inverted-u-section channel member having a web 27 and side flanges 28. The lower edges 29 of flanges 28 constitute runners or sliding surfaces which engage the ground and are provided with curved leading edges 30 within the channel member is disposed a spray nozzle 31 which connects with a tube 26 via a pressure sensitive diaphragm valve 32 which cuts off flow if pressure falls below an operative minimum value. Spray nozzle 31 is designed to generate a flat fan-tail jet 33 whose edges just meet the lower edges of the flanges 28 where they contact the ground. Any appreciable "overlap" between the jet 33 and flanges 28 causes accumulation of fluid on flanges 28, and subsequent gravity flow therefrom, which leads to unacceptable line marking.

Figure 5 shows two ways in which the marker heads 23 may be modified. To the rear of the spray nozzle 31 the head 23 may carry a sliding sole or shoe 34 to reduce friction between the head and the ground. In front of the nozzle 33 can be a roller 34 which improves the travel of the head and depresses upstanding grass blades immediately before the spray to improve marking efficiency.

The apparatus of the invention allows one operator to mark a complete running track in a single transverse simply and without requiring any special skills. Use of a pump driven by a battery or prime mover ensures adequate fluid pressure at all times, unlike a ground wheel drive.

As a modification, the apparatus can be supplemented by the addition of a hand-held marking

lance, comprising a separate marking head on the end of a staff or like handle and connected by a flexible hose to the source of marking fluid. Such hand lance can be used by an operative to mark start and finish lines on a running track, particularly staggered starting lines. The lance can have a manually operable trigger for activating and de-activating the spray head as desired.

10 CLAIMS

1. Line marking apparatus having: a body; means for securing the body to a vehicle; a boom arranged to extend transversely of the direction of travel of the vehicle; a plurality of marker heads depending from the boom; a plurality of flow conduits connecting the heads to a supply of marking fluid; and a pump connected to said conduits for supplying marking fluids to said marker heads.
2. Apparatus as claimed in claim 1 wherein the pump can be driven from a power takeoff.
3. Apparatus as claimed in claim 1 wherein the pump is driven by an electric motor from a battery.
4. Apparatus as claimed in claim 1 wherein the pump is driven by its own prime mover.
5. Apparatus as claimed in claim 3, wherein the battery is that of the vehicle or a separate battery.
6. Apparatus as claimed in any preceding claim wherein the boom is foldable or otherwise jointed to be movable between it deployed condition and a transport condition wherein its width is reduced.
7. Apparatus as claimed in any preceding claim wherein the supply of fluid is a tank in the body.
8. Apparatus as claimed in any of claims 1 to 6 wherein the supply of fluid is a separately mounted tank.
9. Apparatus as claimed in any preceding claim wherein the body is securable to the front of a tractor.
10. Apparatus as claimed in claim 9 when appendant to claim 7 wherein the tank is at the rear of the tractor.
11. Apparatus as claimed in any preceding claim wherein the marker heads are seven in number.
12. Apparatus as claimed in any preceding claim wherein each marker head is in the form of a pair of parallel side plates between which a spray nozzle is disposed.
13. Apparatus as claimed in claim 12 wherein each spray nozzle is a fantail spray nozzle, the fan extending transversely of the side plates.
14. Apparatus as claimed in claim 12 or 13 wherein the side plates constitute ground-engaging runners.
15. Apparatus as claimed in claim 12 or 13 wherein the side plates carry a skid and/or a ground-engaging roller or rollers.
16. Apparatus as claimed in any preceding claim wherein each marker head is mounted on the lower end of a trailing arm whose upper end is pivotally connected to the boom.
17. Apparatus as claimed in claim 16, wherein the pivotal connection is about an axis generally parallel to the boom axis.

18. Apparatus as claimed in claim 16 or 17 wherein each trailing arm is provided with means for locking it in a raised position.

19. Line marking apparatus substantially as hereinbefore described with reference to the accompanying drawings.

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